Project Proposal: Guided workouts using ML

What we want to achieve is having a way to assess the correctness of Pushups, using recorded video as input.

Technology used: OpenPose(a "Real-time multi-person keypoint detection library for body, face, hands, and foot estimation")

1. Dataset: It will be generated by extracting different features like position of shoulder, elbow, head, hips from the input video (Trained professionals doing ideal pushups) using OpenPose. The output data from OpenPose can be stored as a json file which will be used to generate a visual representation (time series curves of position of selected body parts).

2. Machine learning model: Our goal is to compare the pushup video uploaded by the user to the "ideal pushup" metrics. We need our model to find a trend between important features in the dataset of ideal pushup videos. And we also need to find a threshold of error i.e how much deviation from the ideal data is acceptable. We will look into something called "Dynamic time warping" for measuring similarities between the time sequences generated from the json data.

3. We will create a webapp where the user can upload the pushup video. The output will be a similarity score indicating the accuracy of the user's pushups as determined by the ML model.